



Environmental Site Design Implementation in Montgomery County, Maryland: Image Library



Prepared for:
Montgomery County Planning Department
Maryland-National Capital Park and Planning Commission

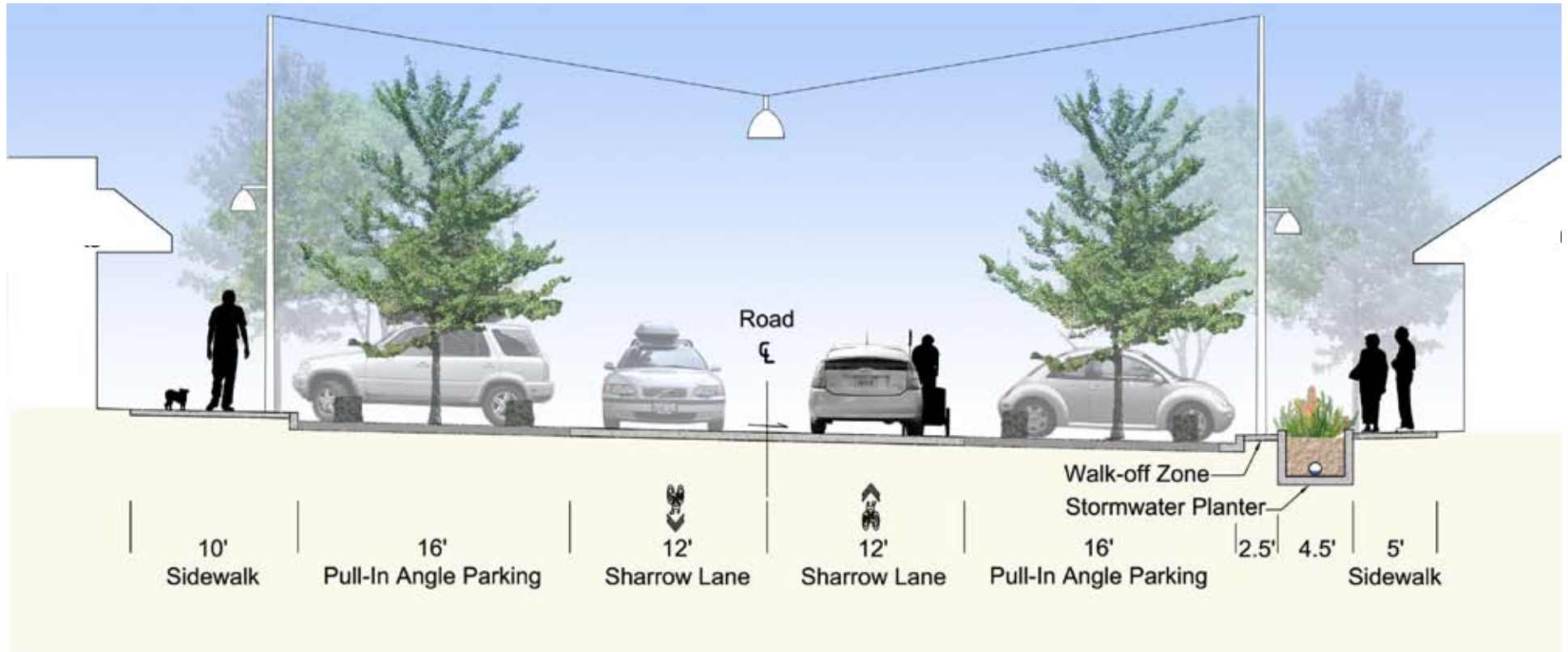


Prepared by:
Peg Staeheli ASLA, LEED® AP
Amalia Leighton PE
www.svrdesign.com



URBAN MAIN STREET

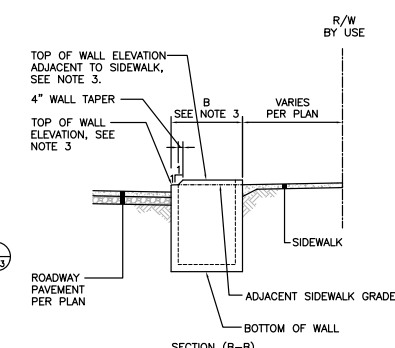
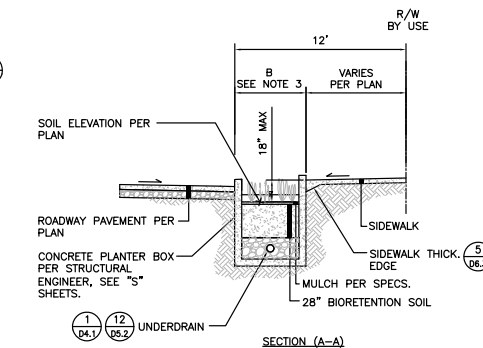
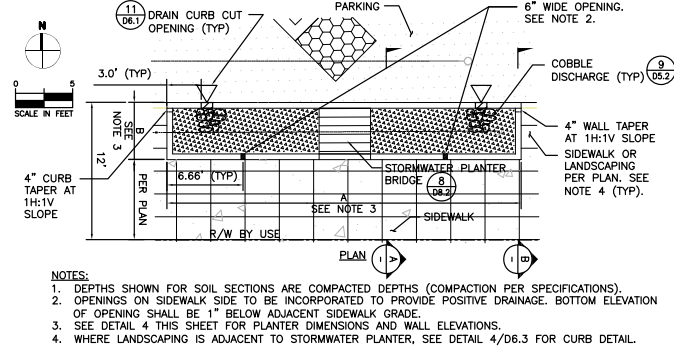
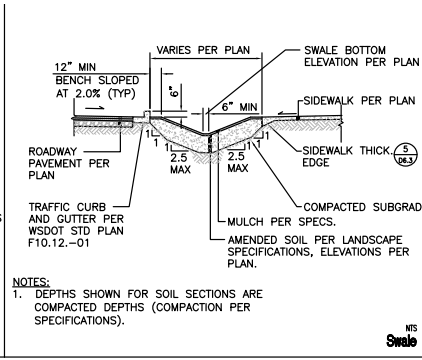
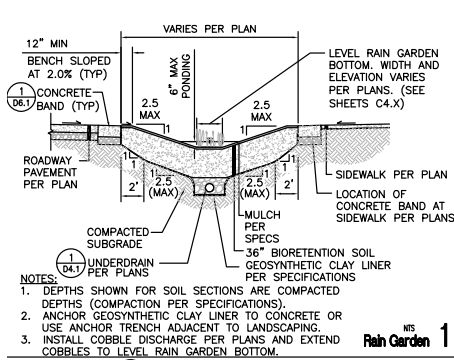
Plan of urban "main street" with environmental site design components.



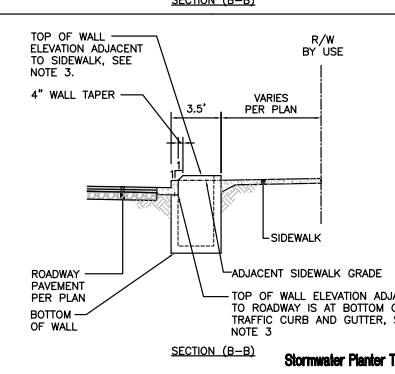
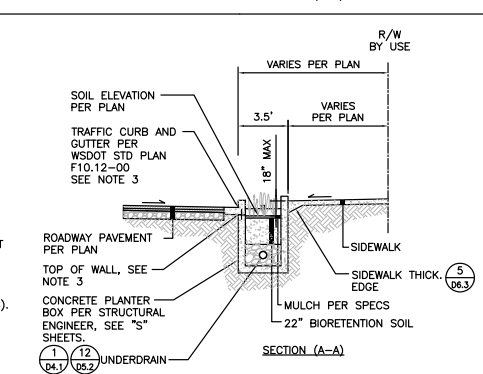
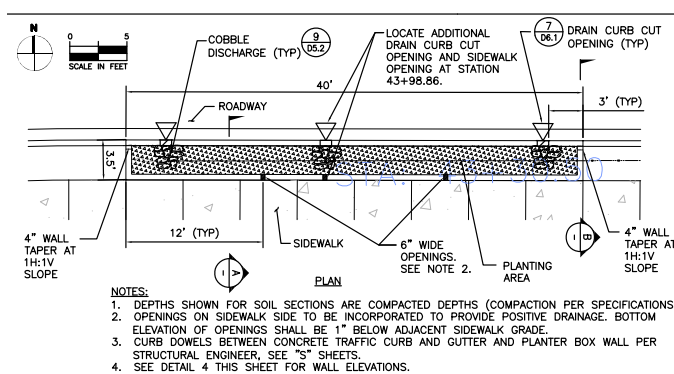
URBAN MAIN STREET

The street uses a stormwater planter, curb bulbs for trees and porous pavements while accommodating a flexible streetscape that can be used for everyday activities and special events like parades.





Stormwater Planter Type 1



Stormwater Planter Type 2

PLEASE CALL 3 Working Days BEFORE YOU DIG 1-800-424-6655

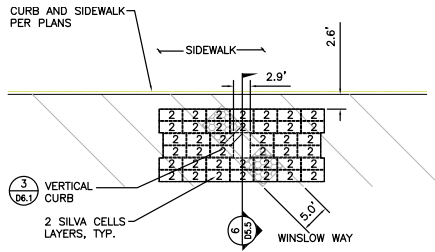
BID SET



URBAN MAIN STREET

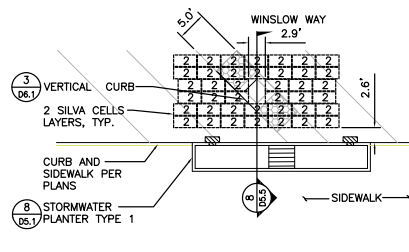
Stormwater planter details.





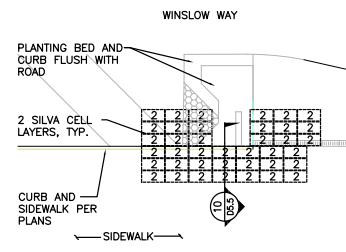
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1. PAVEMENT PER PLANS.
 2. THERE ARE 80 SILVA CELLS IN THIS CONFIGURATION.

Typical North Silva Cell Plan 1



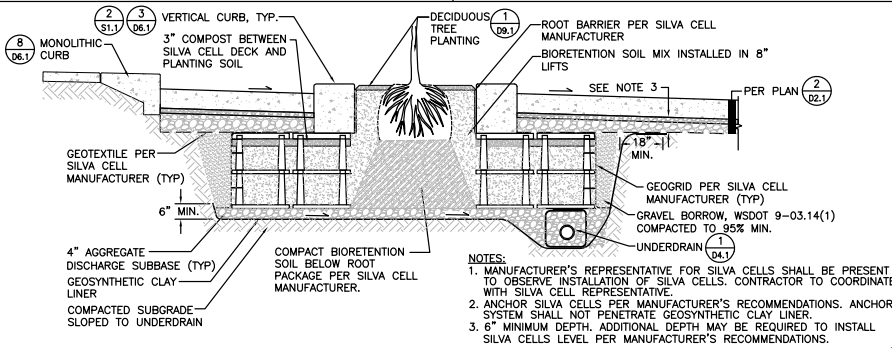
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 2. THERE ARE 80 SILVA CELLS IN THIS CONFIGURATION.

Typical South Silva Cell Plan 2



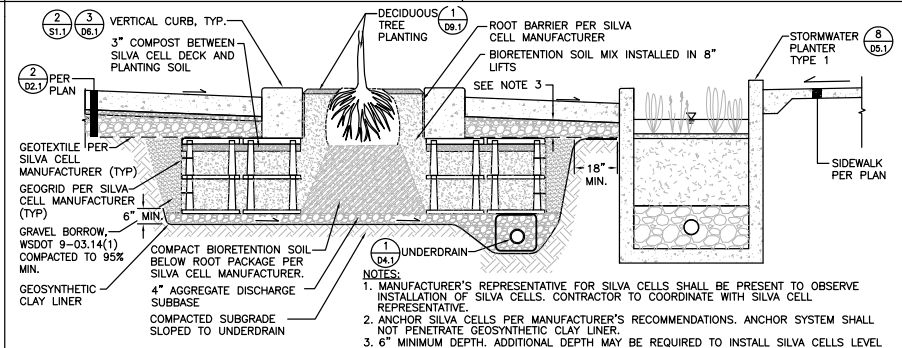
- NOTE:
1. PAVEMENT PER PLANS.
 2. THERE ARE 78 SILVA CELLS IN THIS CONFIGURATION.

Silva Cell Plan at Station 38+70 RT 3



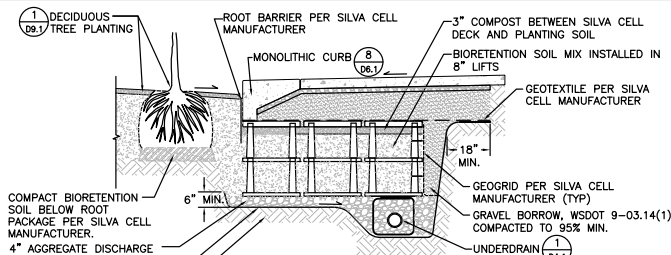
- NOTES:
1. MANUFACTURER'S REPRESENTATIVE FOR SILVA CELLS SHALL BE PRESENT TO OBSERVE INSTALLATION OF SILVA CELLS. CONTRACTOR TO COORDINATE WITH SILVA CELL REPRESENTATIVE.
 2. ANCHOR SILVA CELLS PER MANUFACTURER'S RECOMMENDATIONS. ANCHOR SYSTEM SHALL NOT PENETRATE GEOSYNTHETIC CLAY LINER.
 3. 6" MINIMUM DEPTH. ADDITIONAL DEPTH MAY BE REQUIRED TO INSTALL SILVA CELLS LEVEL PER MANUFACTURER'S RECOMMENDATIONS.

Typical Silva Cell North Section 6



- NOTES:
1. MANUFACTURER'S REPRESENTATIVE FOR SILVA CELLS SHALL BE PRESENT TO OBSERVE INSTALLATION OF SILVA CELLS. CONTRACTOR TO COORDINATE WITH SILVA CELL REPRESENTATIVE.
 2. ANCHOR SILVA CELLS PER MANUFACTURER'S RECOMMENDATIONS. ANCHOR SYSTEM SHALL NOT PENETRATE GEOSYNTHETIC CLAY LINER.
 3. 6" MINIMUM DEPTH. ADDITIONAL DEPTH MAY BE REQUIRED TO INSTALL SILVA CELLS LEVEL PER MANUFACTURER'S RECOMMENDATIONS.

Typical Silva Cell South Section 8



- NOTES:
1. MANUFACTURER'S REPRESENTATIVE FOR SILVA CELLS SHALL BE PRESENT TO OBSERVE INSTALLATION OF SILVA CELLS. CONTRACTOR TO COORDINATE WITH SILVA CELL REPRESENTATIVE.
 2. ANCHOR SILVA CELLS PER MANUFACTURER'S RECOMMENDATIONS. ANCHOR SYSTEM SHALL NOT PENETRATE GEOSYNTHETIC CLAY LINER.

Silva Cell Section at Station 38+70 RT 10

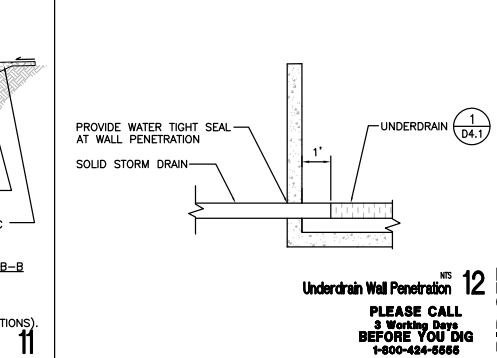
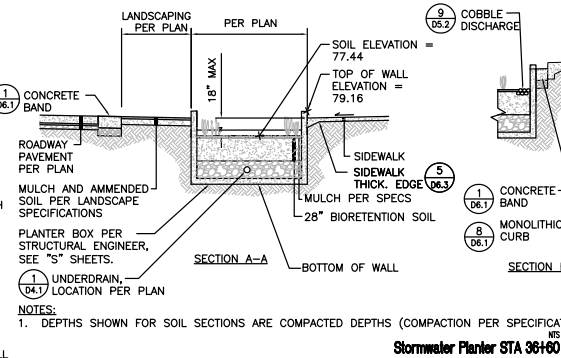
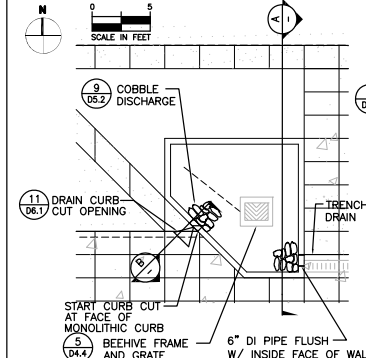
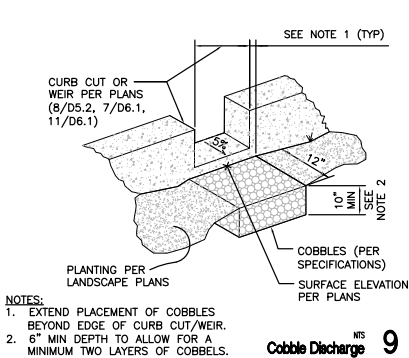
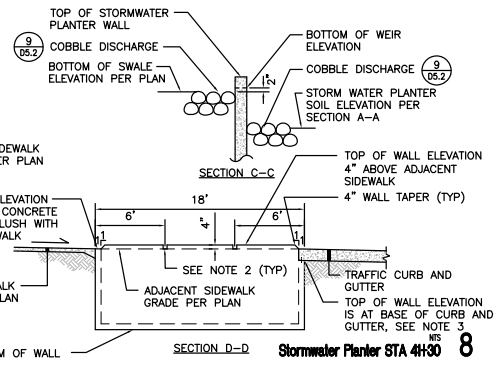
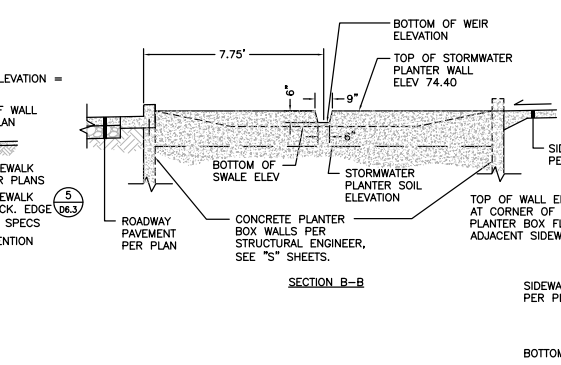
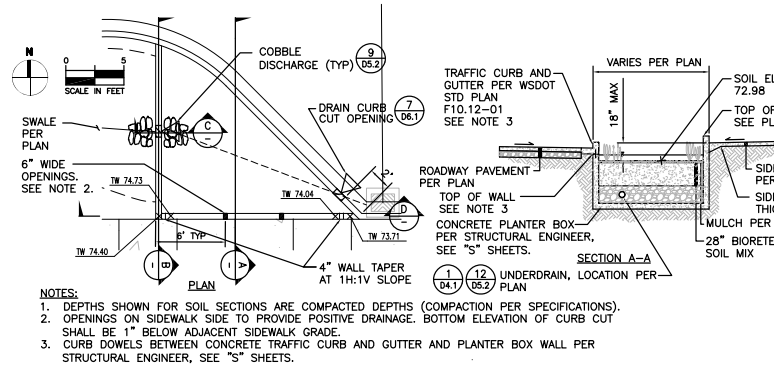
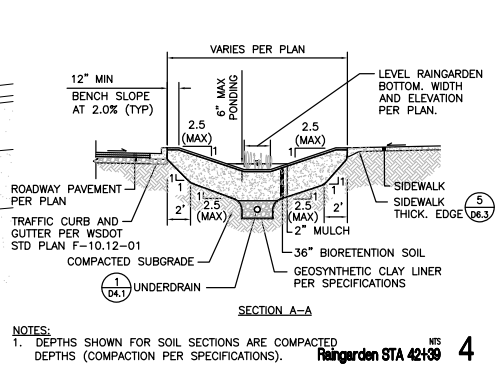
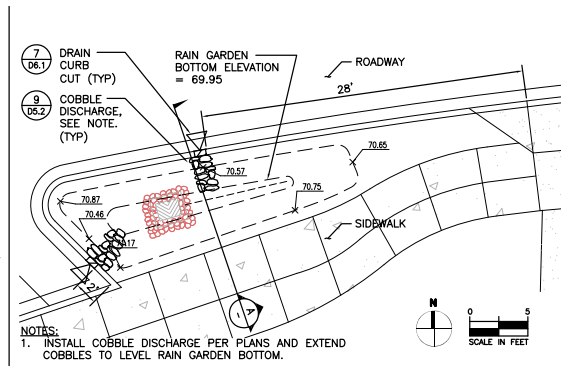
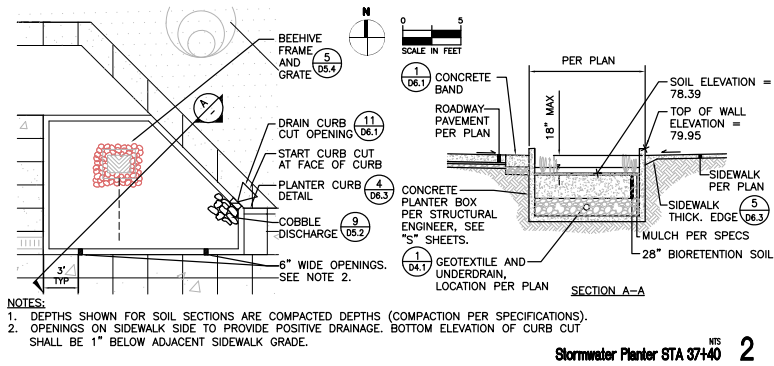
Not Used 12
PLEASE CALL
3 Working Days
BEFORE YOU DIG
1-800-434-5555
BID SET



URBAN MAIN STREET

Stormwater planter details including tree plantings.

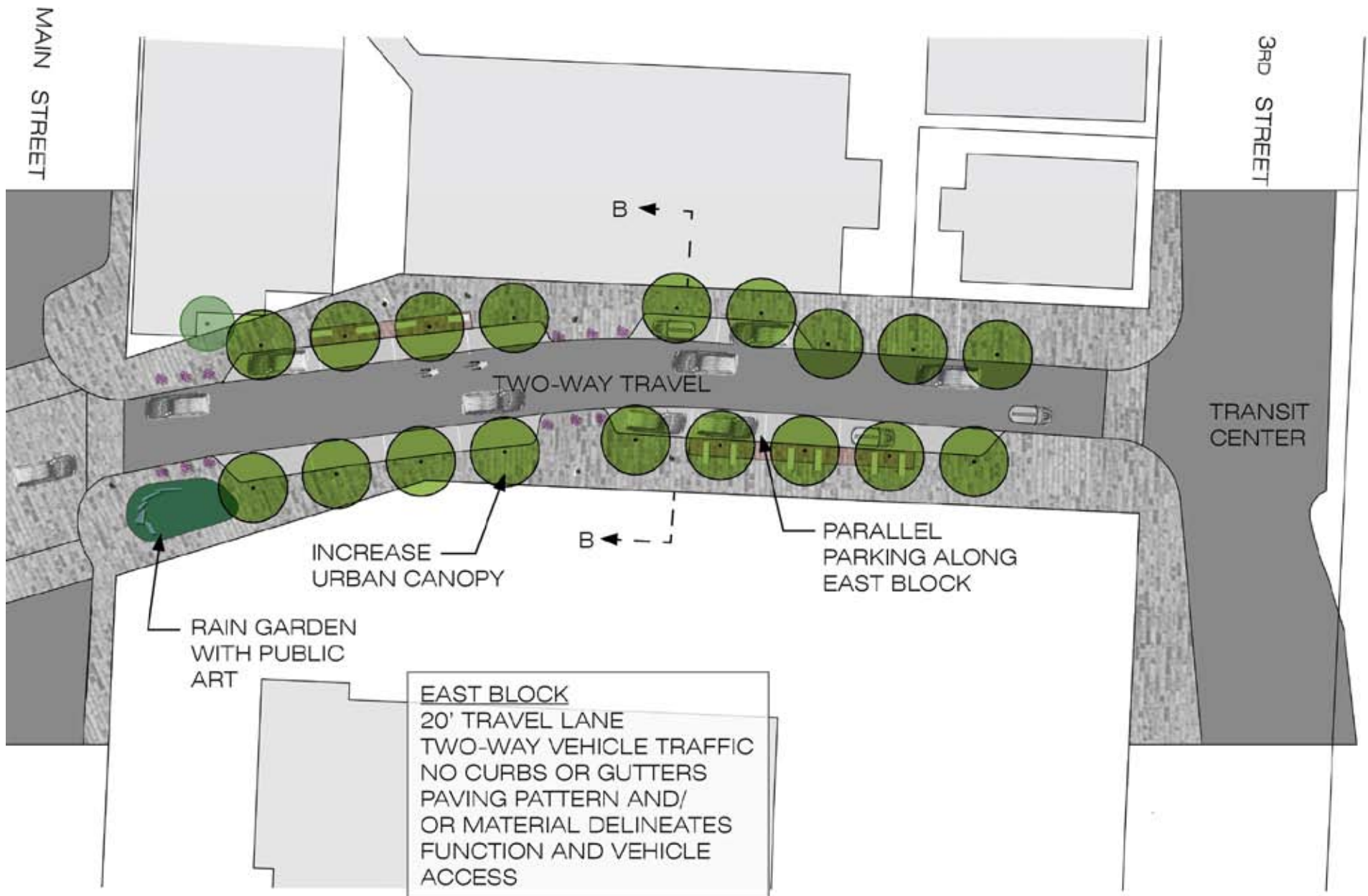




URBAN MAIN STREET

ESD details focusing on raingardens and stormwater planters.



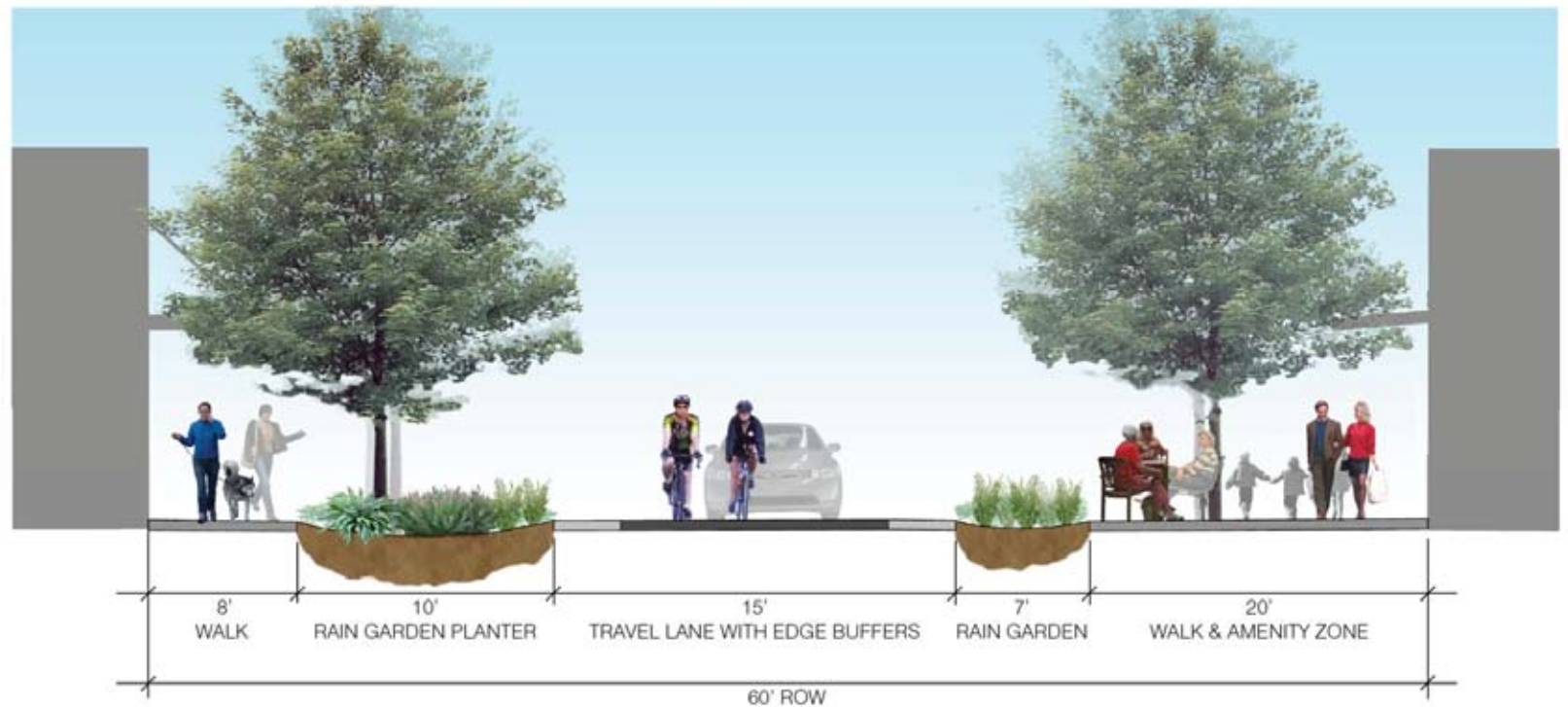


URBAN WOONERF

This project, in the heart of a suburban business core, combines environmental site design features with the Dutch design philosophy of a “shared space” woonerf.



SECTION A-A: WEST BLOCK (NOT TO SCALE)



URBAN WOONERF

The curbless green street cross section.





URBAN STREET RETROFIT #1

Urban ESD retrofits can help improve mobility, in this case coupling the stormwater planter with pedestrian and bicycle improvements. These stormwater planters overflow back into the existing piped system. The curb bulb reduces pedestrian crossings, provides clear parking limits and edges the bike box.





URBAN STREET RETROFIT #2

With the “Beckoning Cistern” gathering rain from the adjacent building, the street right-of-way was retrofit to slow and reveal stormwater flows. These projects integrated art into stormwater management.

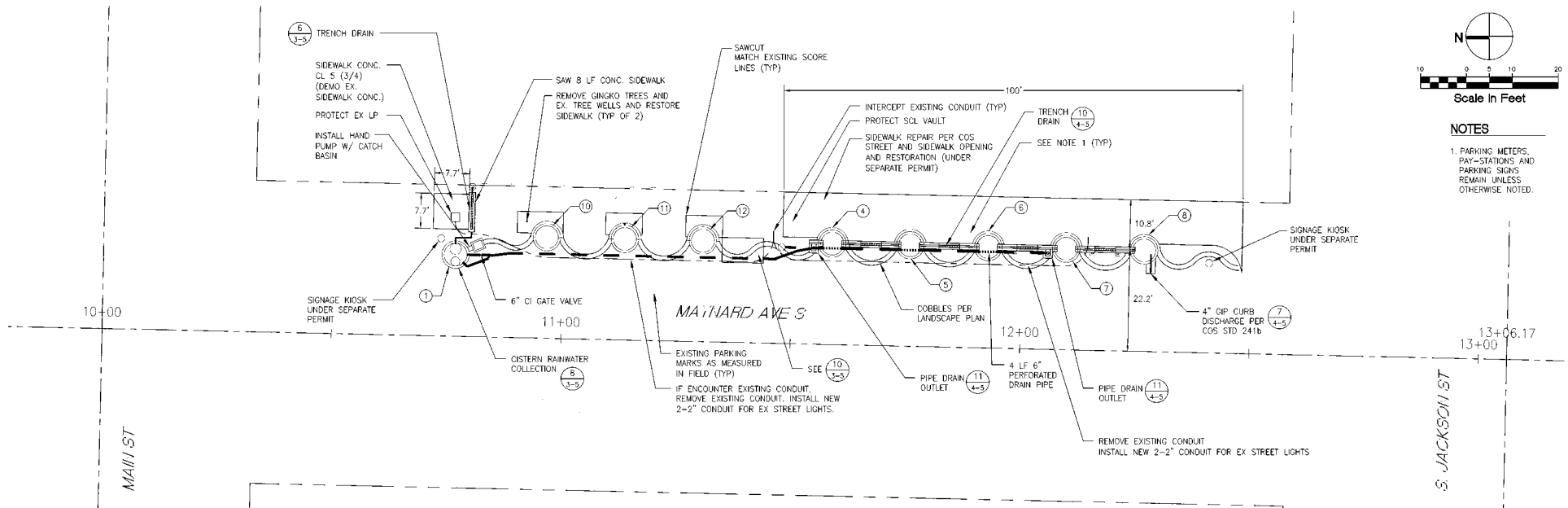




URBAN STREET RETROFIT #3

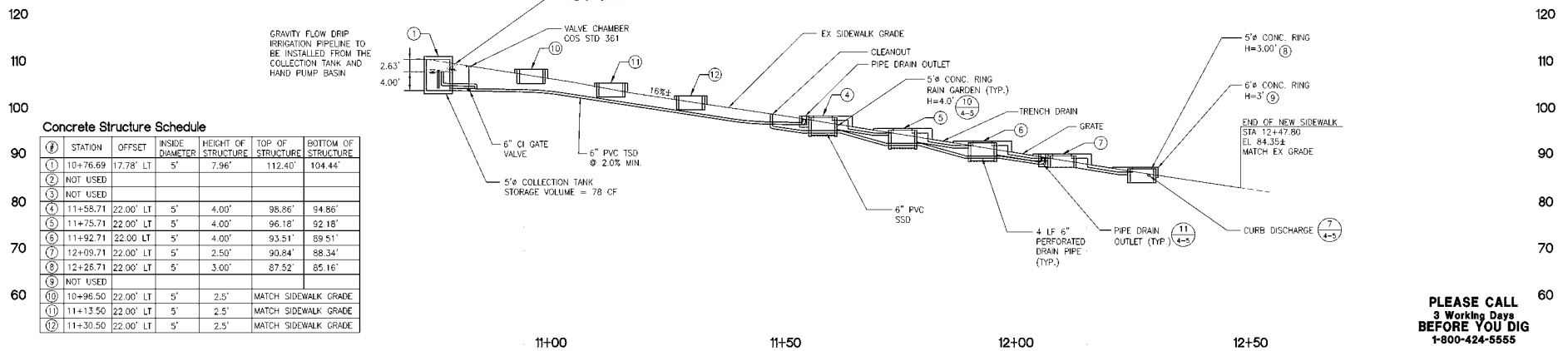
In a steeply-sloping downtown core, rainwater is harvested from rooftops and then run through a series of planted cells. These cells retain water before entering the combined system.





NOTES

1. PARKING METERS, PAY-STATIONS AND PARKING SIGNS REMAIN UNLESS OTHERWISE NOTED.



PLEASE CALL
3 Working Days
BEFORE YOU DIG
1-800-424-5555



URBAN STREET RETROFIT #3

The plan and section for the street reveal the ESD strategies' vertical and horizontal detailing.





URBAN STREET RETROFIT #4

This downtown streetscape has been retrofit to include ESD features.





URBAN STREET RETROFIT #4

At intersections, new curb bulbs were added that also include bioretention areas which help slow traffic, and define the parking zone. Existing trees were carefully integrated into the plan.





URBAN STREET RETROFIT #4

Closer inspection of the bioretention cells at the intersection curb bubs.





RESIDENTIAL GREEN STREET

A new residential street uses pervious concrete and a bioretention area/rain garden as part of its ESD strategy. The pervious concrete road drains to the bioretention swale during larger storm events (25 to 100 year storms).

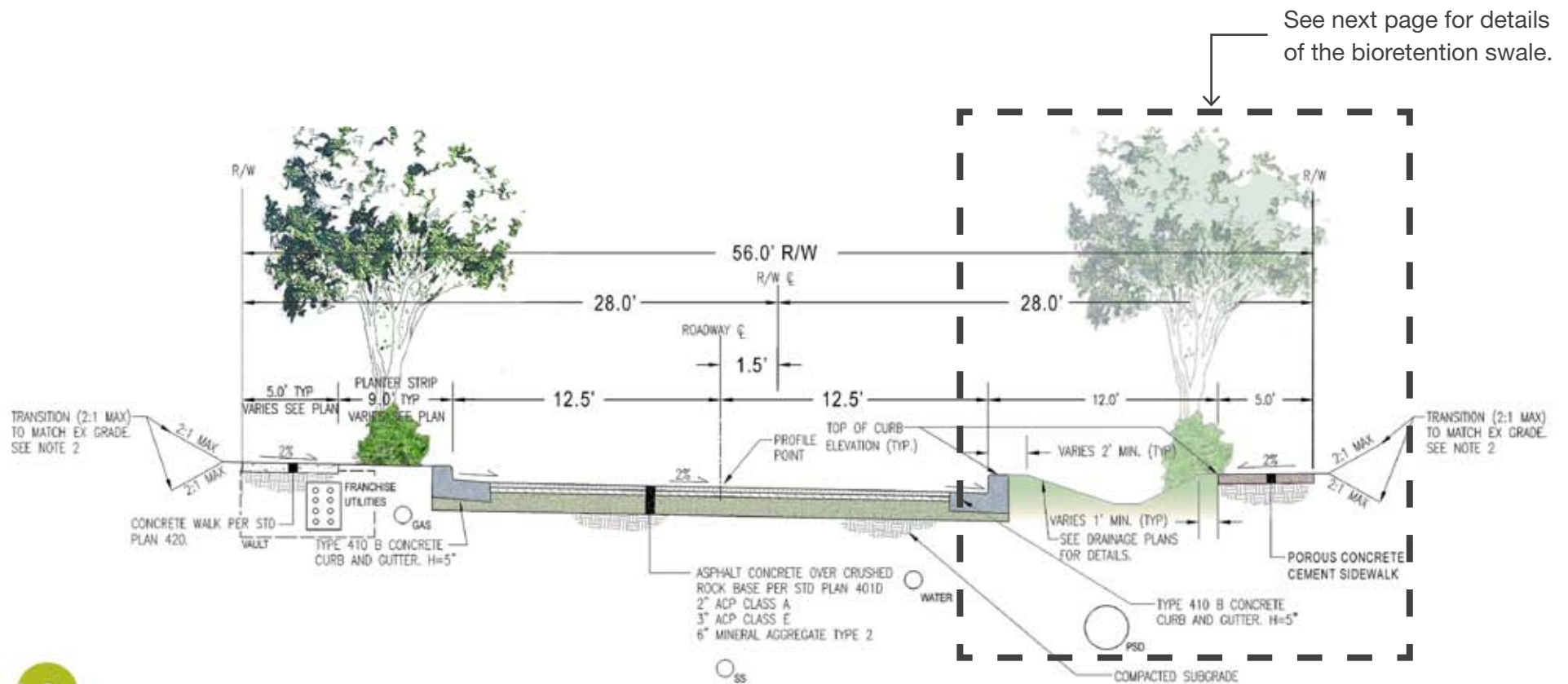




RESIDENTIAL GREEN STREET

A residential roadway with grass-lined swales on one side of the street. The adjacent sidewalk is constructed with pervious concrete.

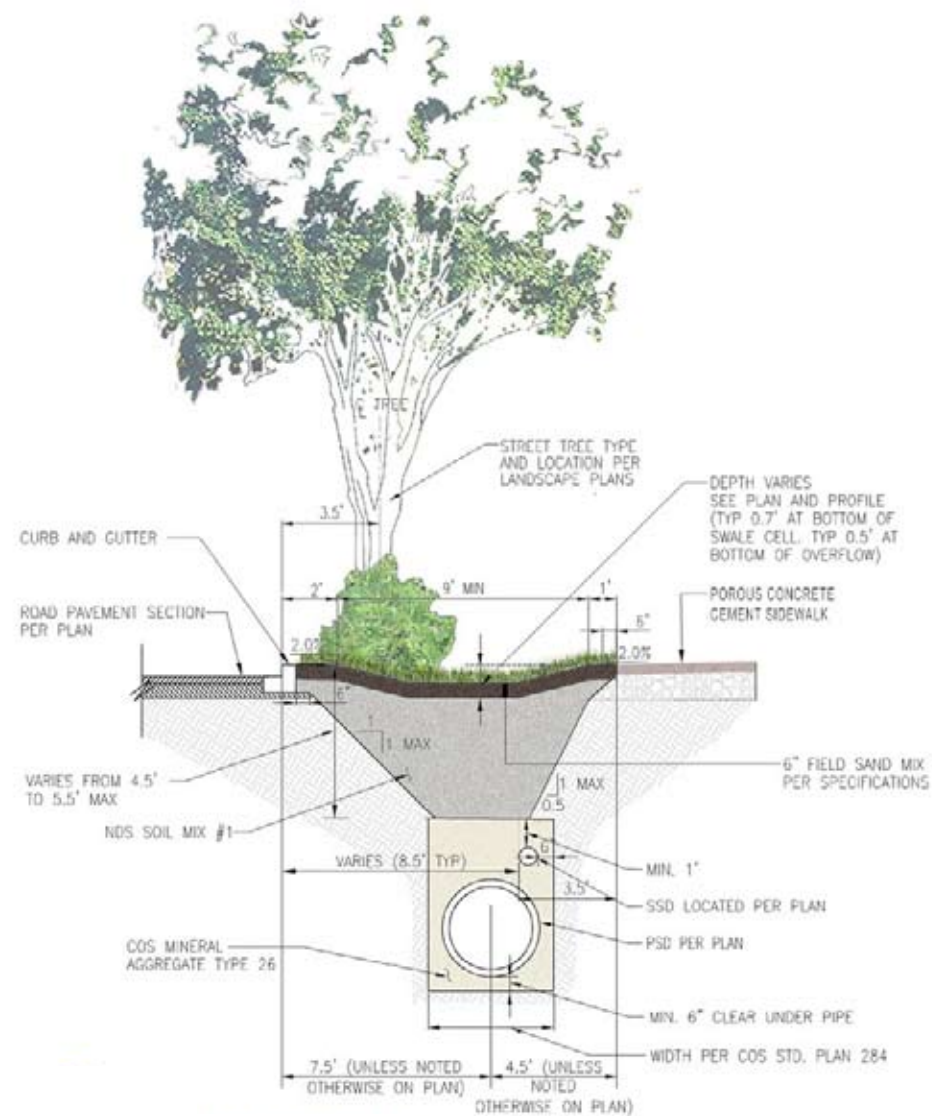




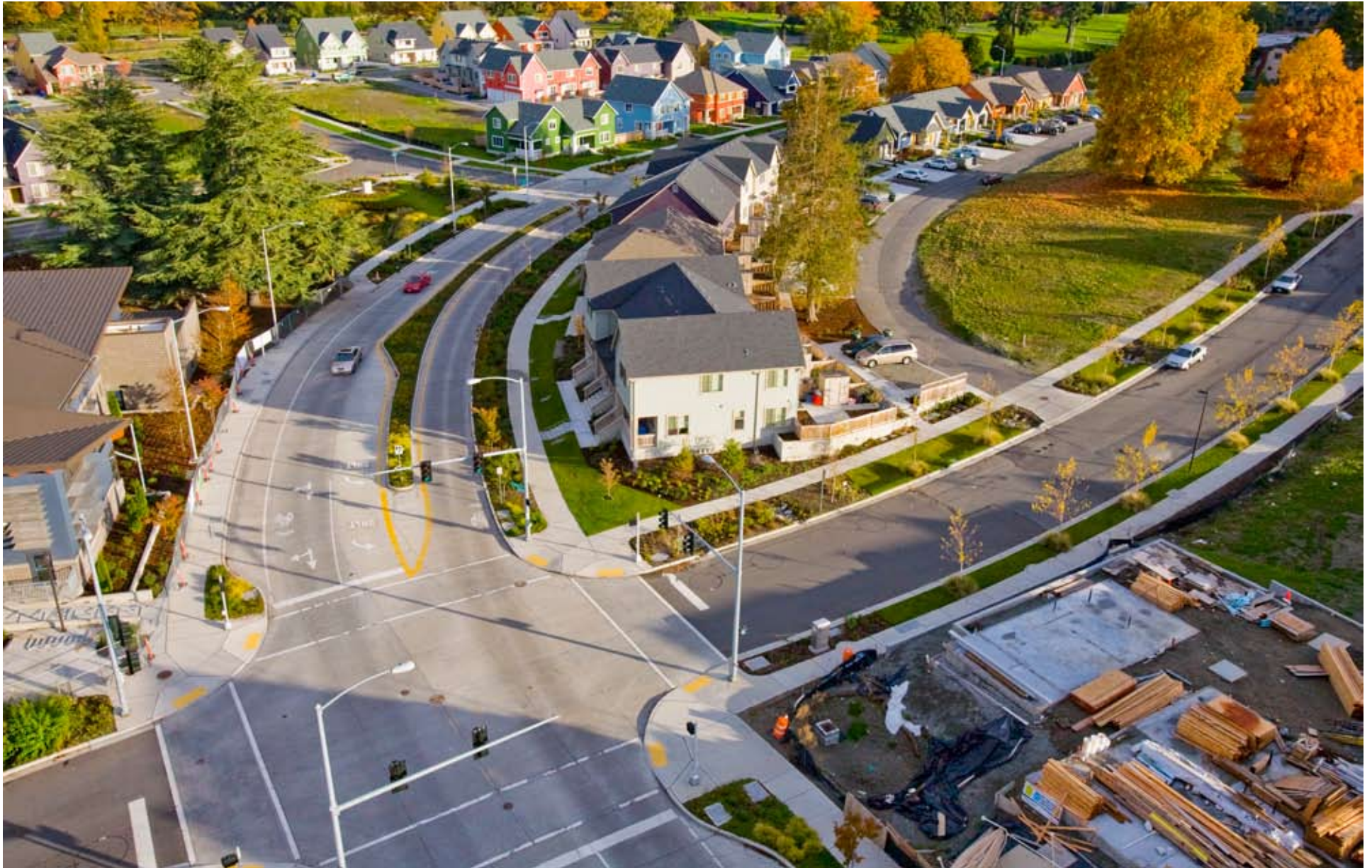
Typical Residential Street Section with 25' Roadway and 56' Right-of-Way

RESIDENTIAL GREEN STREET

In this section, the 56' right of way still allows for ESD on one side of the roadway. Pervious concrete sidewalk slopes toward the swale.



Details for two bioretention swale typologies. On the left is the deeper, vegetated swale with 10" surface parking. On the right is the shallower grass-lined swale with two inches of ponding. The facilities overflow into a piped system during larger storm events.



RESIDENTIAL ARTERIAL GREEN STREET

A new arterial through mid-rise and ground-related residential housing uses ESD stormwater swales on both sides of the street while preserving existing trees.





RESIDENTIAL RETROFIT

This residential retrofit did not have funding for full curb and gutter or to add a piped drainage system. Instead, small bioretention cells and a new porous asphalt pathway were added to manage stormwater and reduce the impervious area footprint. In the distance, the new path winds around an existing tree.





RESIDENTIAL RETROFIT

The design used ESD measures such as porous asphalt and tree preservation (foreground) combined with bioinfiltration areas (background). In this image, the bioinfiltration areas were also used with a chicane to calm traffic.





Proposed Plan



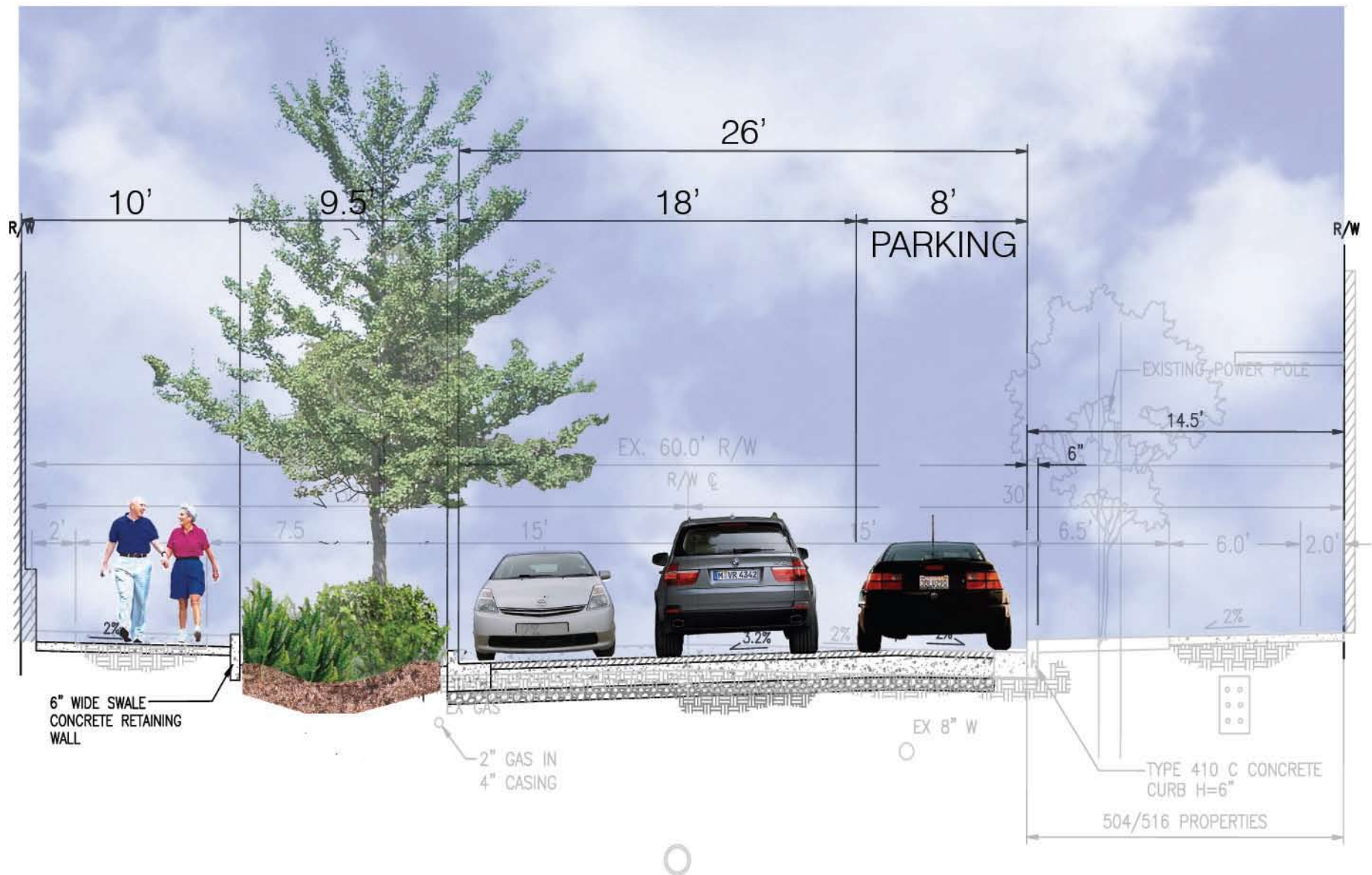
Existing Conditions



REDEVELOPMENT #1

This urban redevelopment of two parcels triggered the use of a variety of ESD strategies both on the private parcels and in the streetscape.

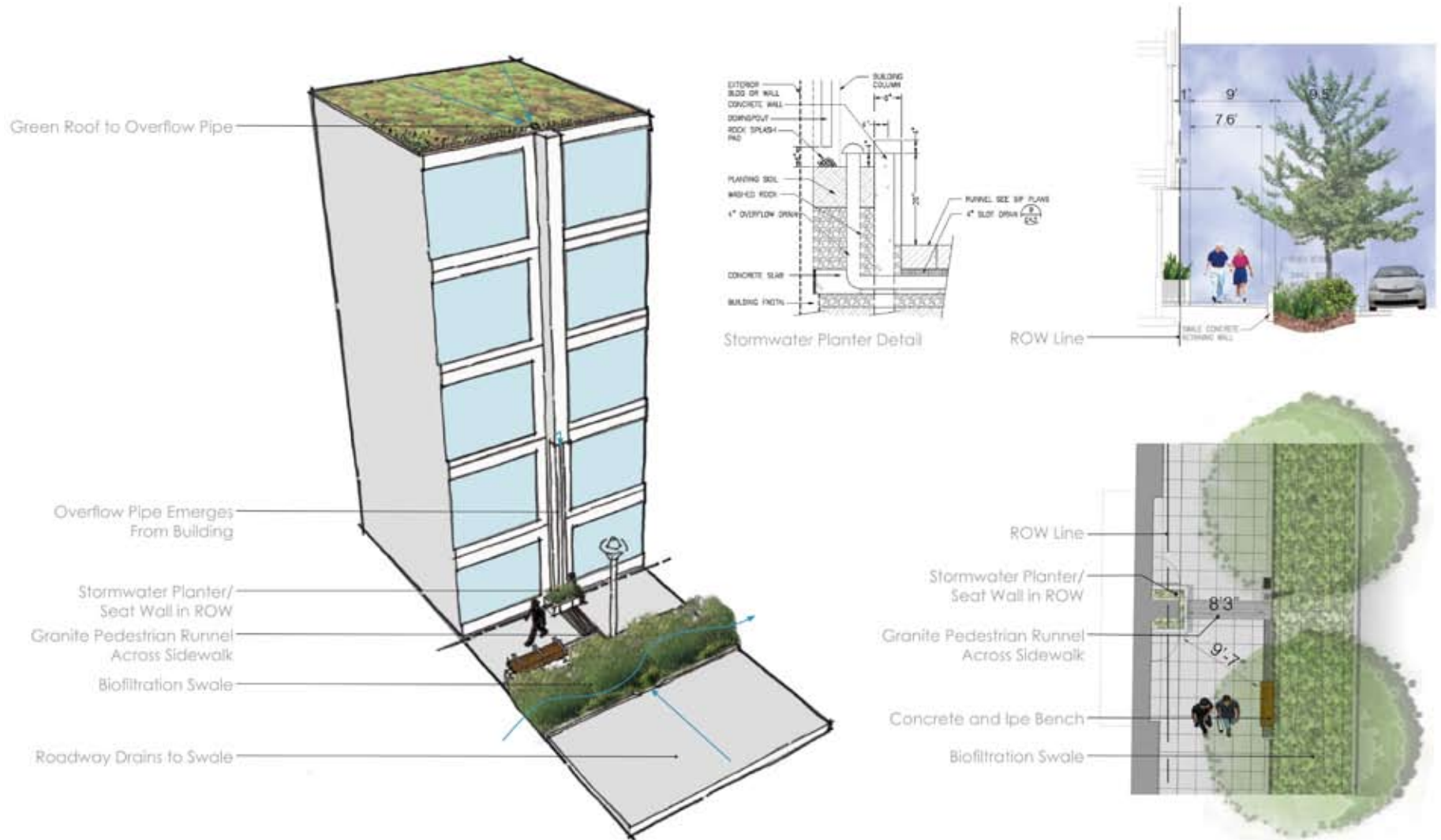




REDEVELOPMENT #1

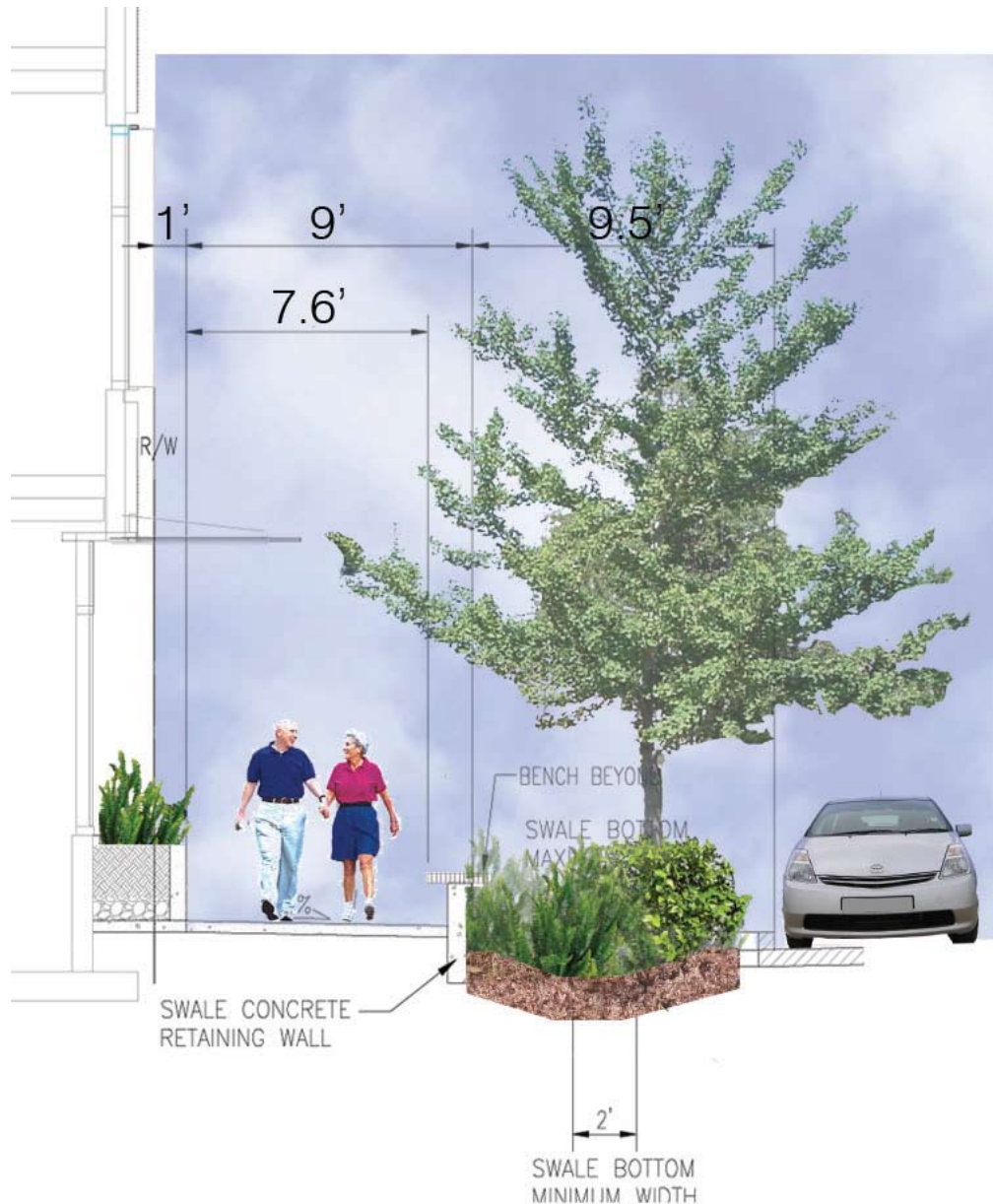
The reconfigured street proposes to throw the travel lanes to a bioretention swale. Parking is only on one side of the street





REDEVELOPMENT #1

The bioretention swale was just one of the ESD strategies used in this project to treat and attenuate stormwater from both the public and private site.



REDEVELOPMENT #1

Careful detailing of the ESD/urban design features allow for a seamless integration of public and private investments to create a unique streetscape.





REDEVELOPMENT #1

At the north end of the site, a “woonerf” provides a continuous, unbroken plane of pavement from one edge of the right-of-way to the other--except when interrupted by the swale--and then into the building’s outdoor atrium. This concept may be most applicable on a low volume street or alley.

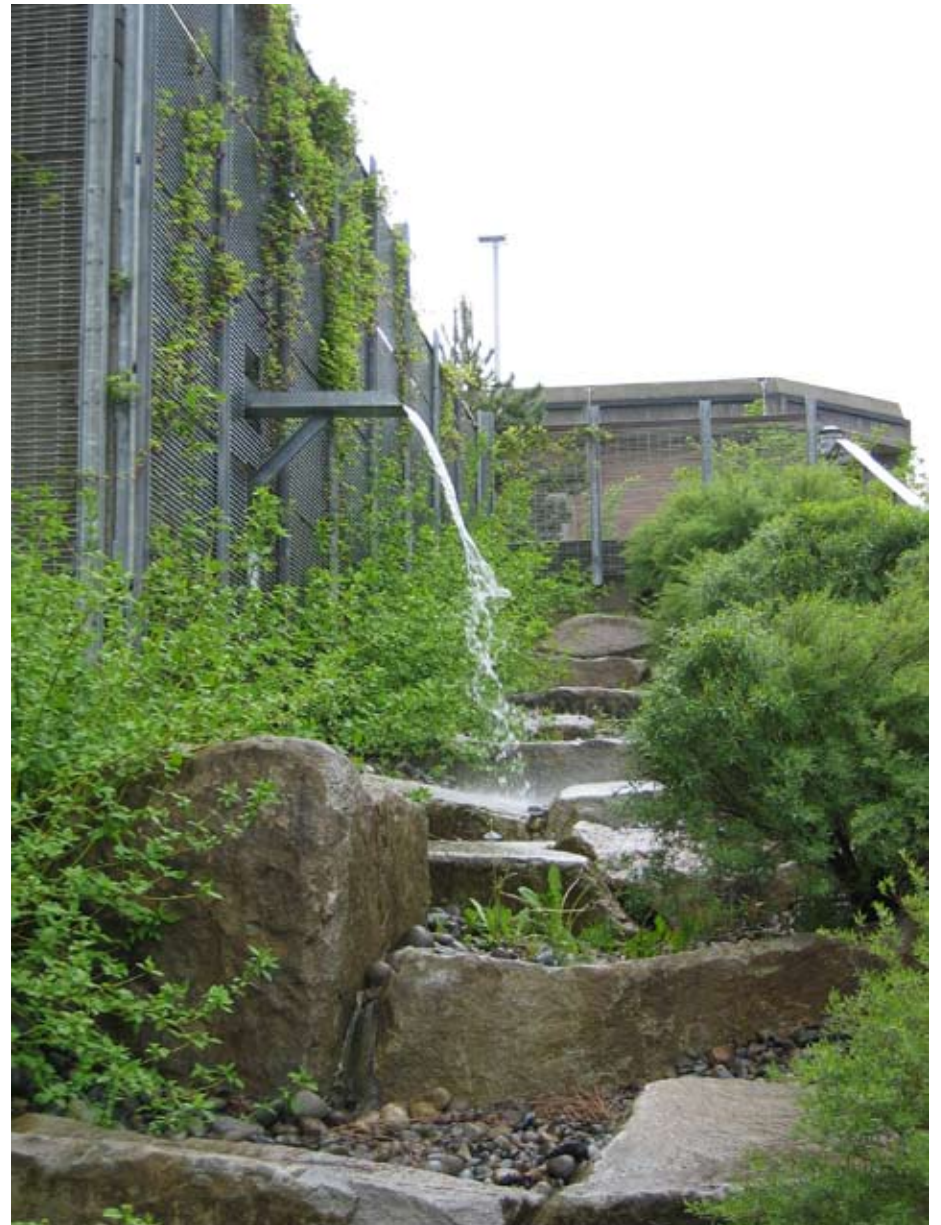




REDEVELOPMENT #2

Private redevelopment can use stormwater requirements to showcase ESD techniques. These stormwater planters manage stormwater within the privately-owned, publicly-accessible open space. Water is mitigated on site before being slowly released to the public system.





REDEVELOPMENT #3

At this new municipal building a terraced set of gardens receive runoff from the roof and slowly release stormwater runoff on this private parcel.



REDEVELOPMENT #4

This shopping mall parking lot was redeveloped to include ESD features like rain gardens as part of the stormwater strategy.



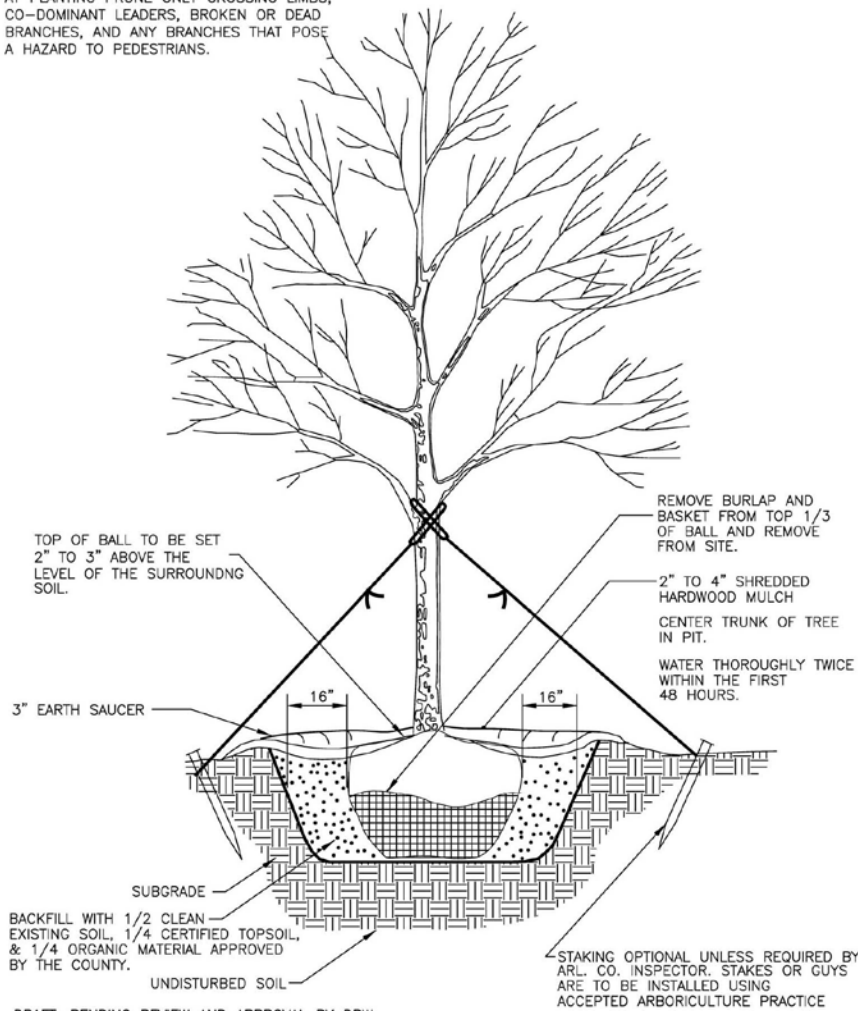


REDEVELOPMENT #4

The same shopping mall parking lot after several years of plant growth. Learn more about the municipal guidance for this project at: <http://www.seattle.gov/dclu/publications/cam/CAM515.pdf>



AT PLANTING PRUNE ONLY CROSSING LIMBS, CO-DOMINANT LEADERS, BROKEN OR DEAD BRANCHES, AND ANY BRANCHES THAT POSE A HAZARD TO PEDESTRIANS.



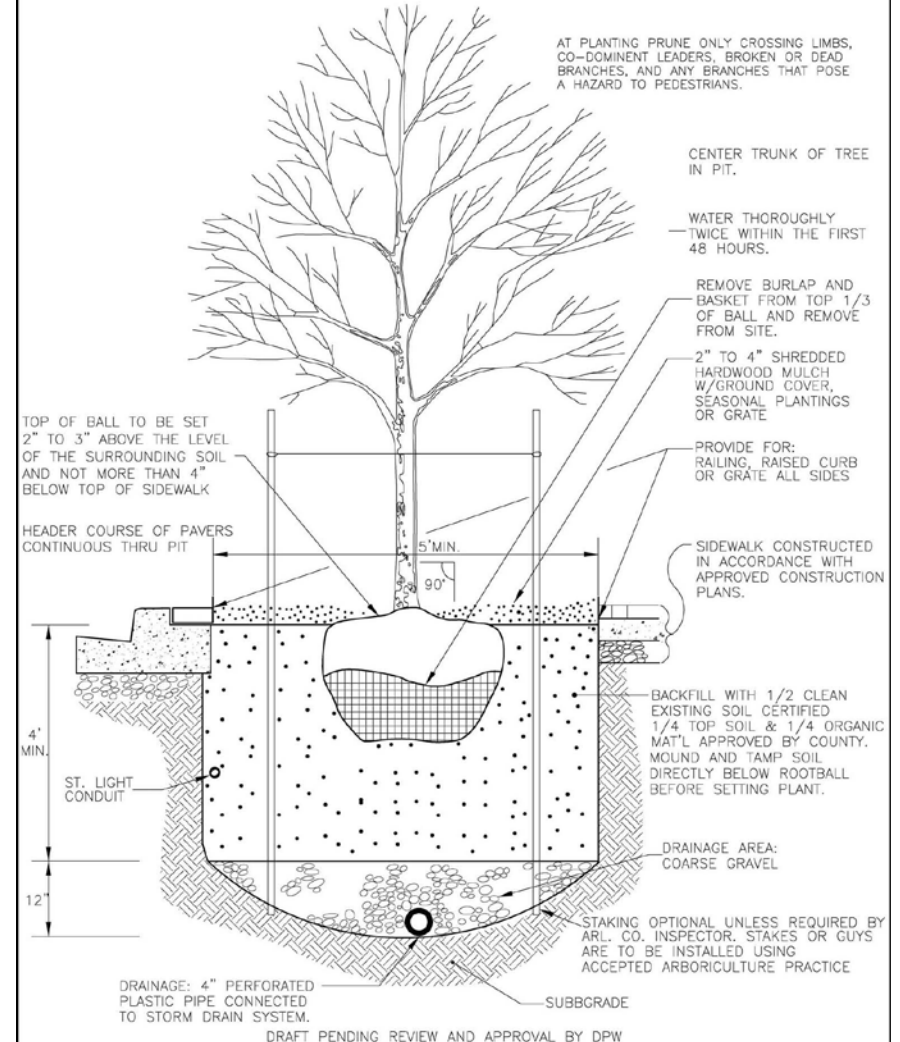
PLANTING TREES IN OPEN AREA OR GRASS STRIP



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF PUBLIC WORKS

DRAWING NO.
R-7.2

DIRECTOR DATE



TREE PLANTING DETAIL FOR STREET TREE IN PIT



ARLINGTON COUNTY, VIRGINIA
DEPARTMENT OF PUBLIC WORKS

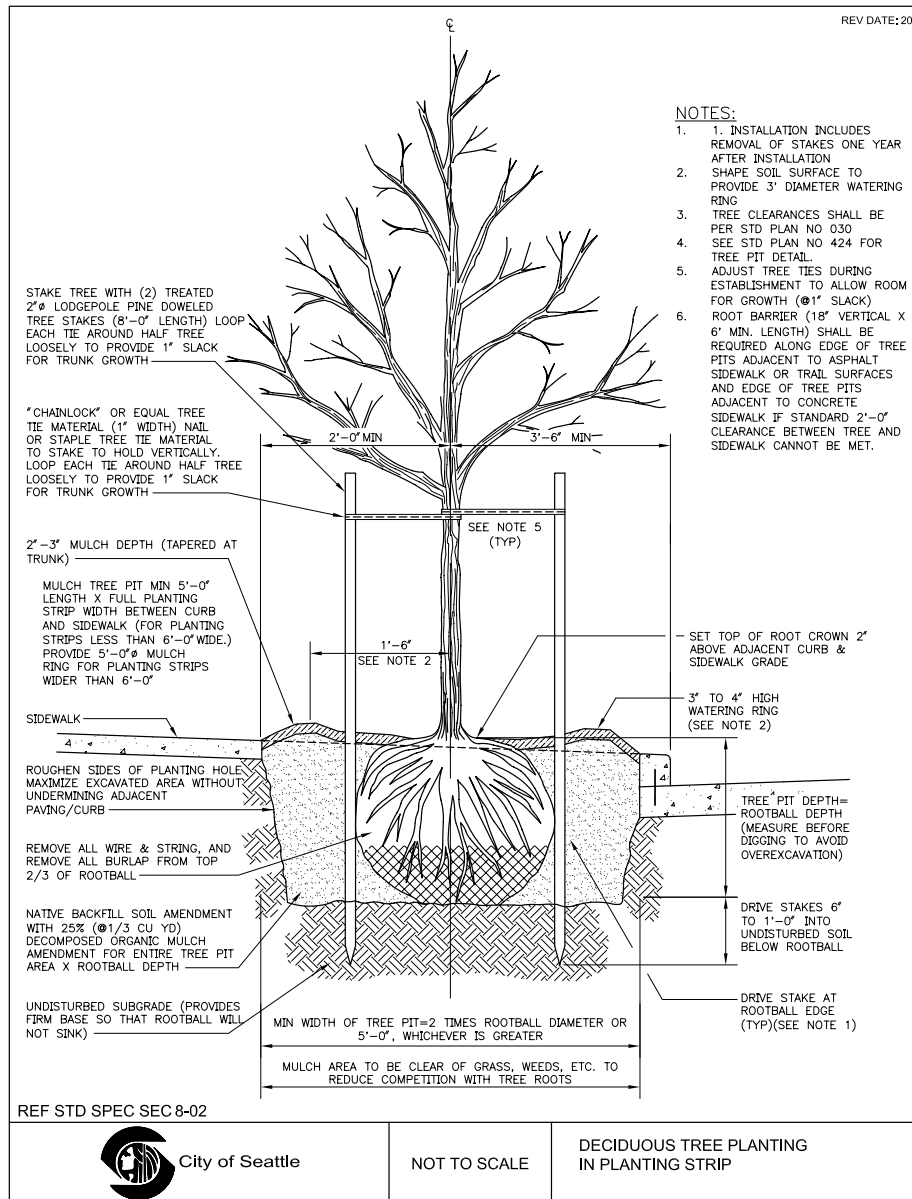
DRAWING NO.
R-7.6

DIRECTOR DATE

TREE DETAILS - ARLINGTON COUNTY, VA

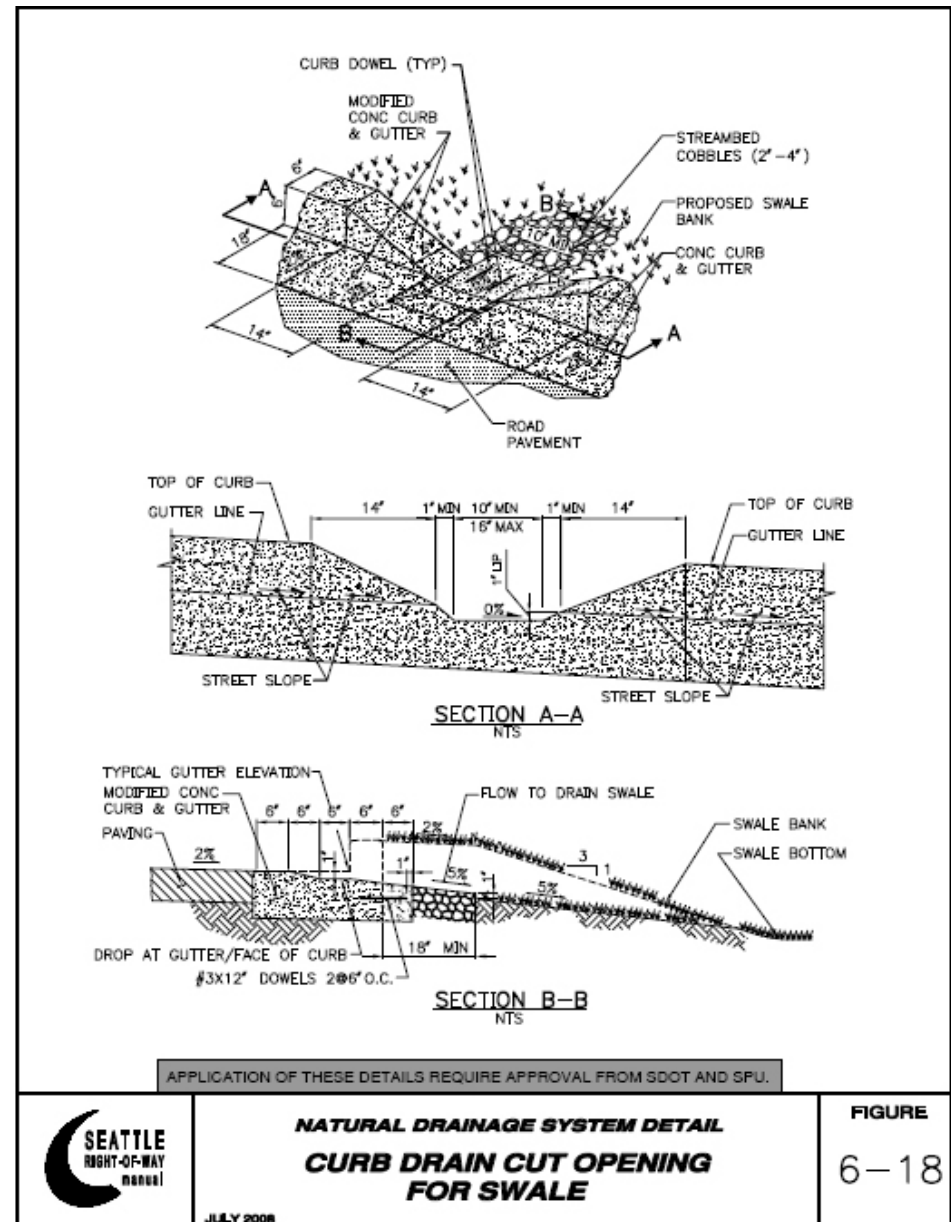
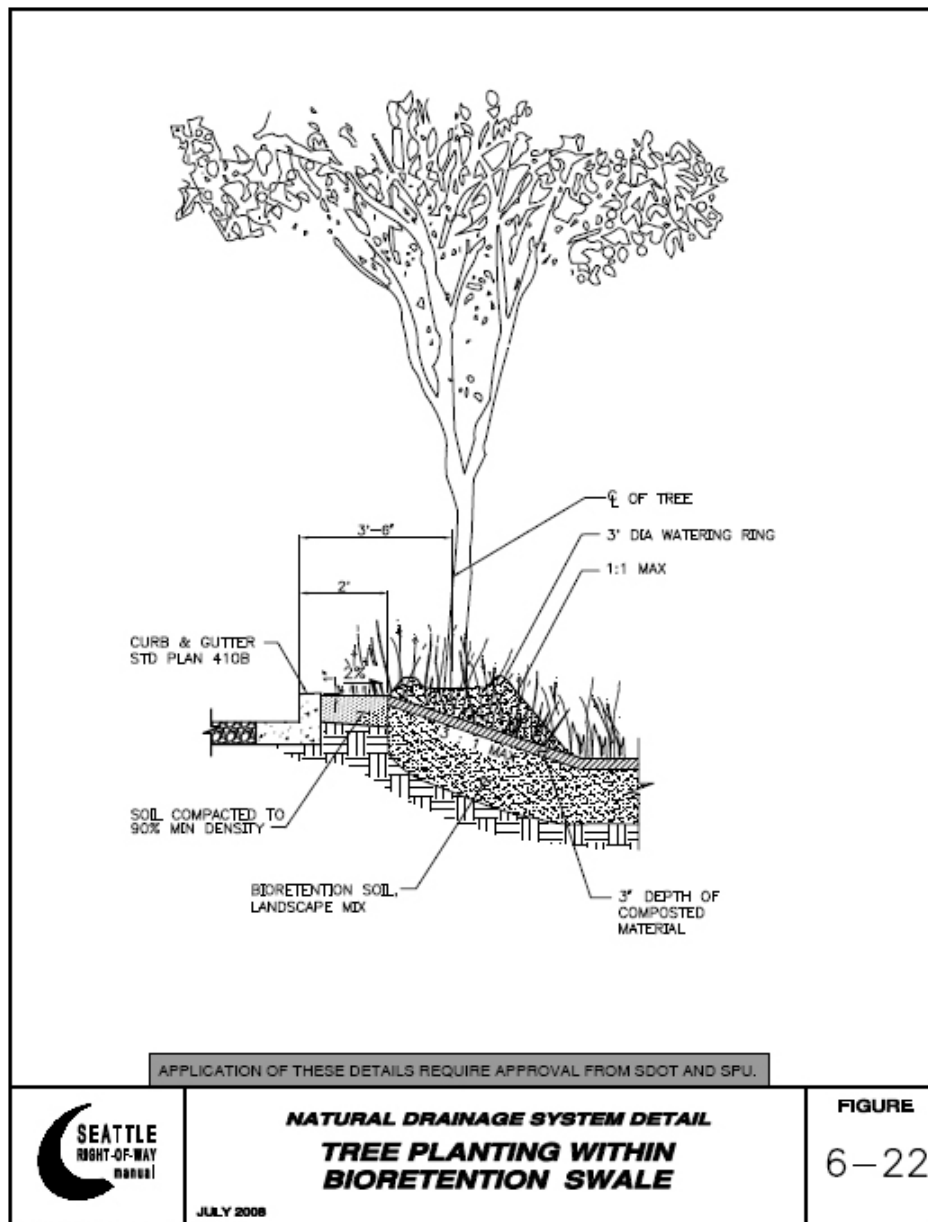
Learn more at: http://www.arlingtonva.us/departments/cphd/planning/applications/site_plans/pdfs/final_treeplanting_061303.pdf

SvR



TREE DETAILS - SEATTLE, WA

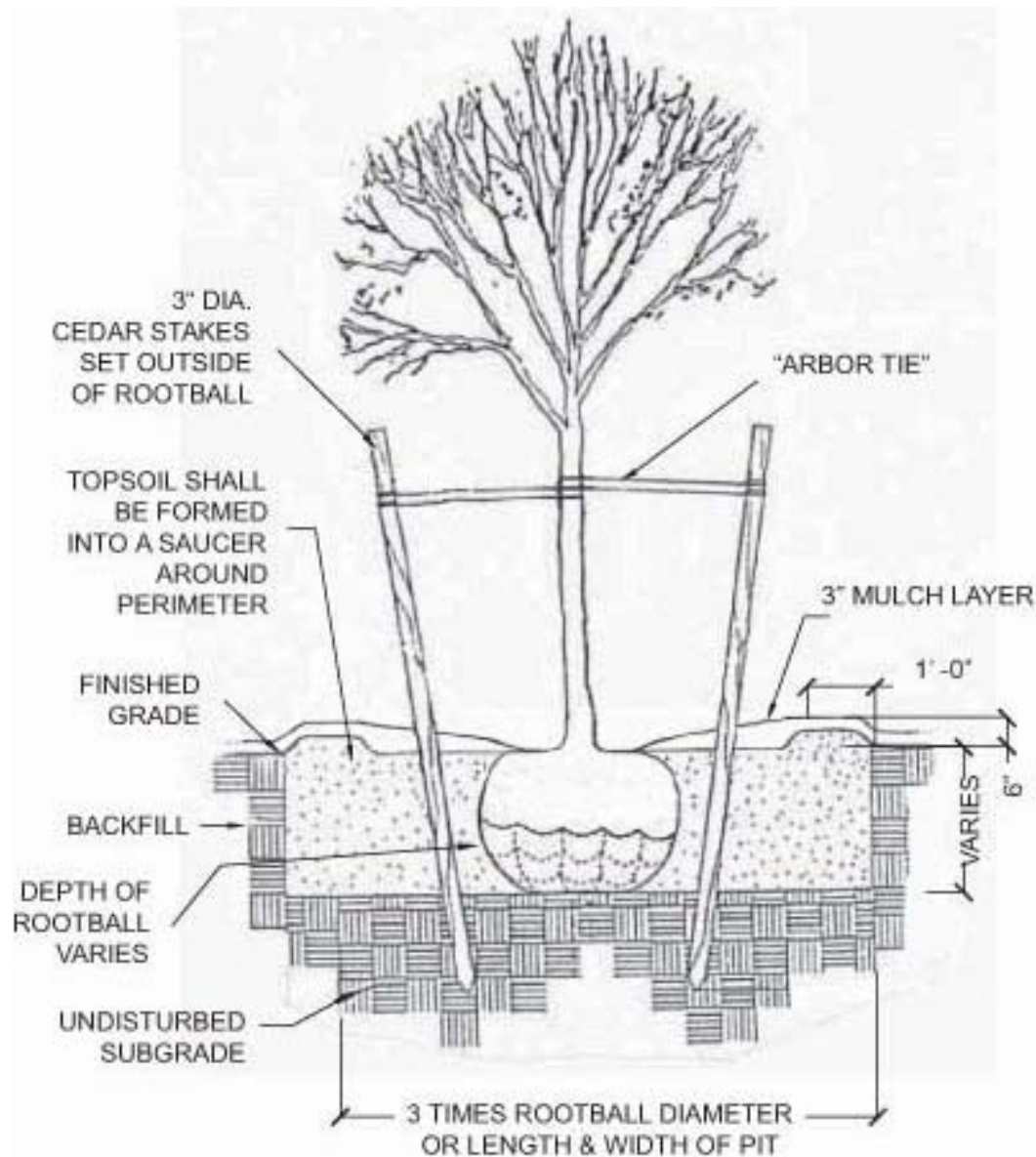
Learn more at: http://www.seattle.gov/util/groups/public/@spu/@engineering/documents/webcontent/01_011355.pdf



TREE DETAILS - SEATTLE, WA

City of Seattle details for swales. Learn more at: http://www.seattle.gov/transportation/rowmanual/manual/pdf/Bioretention_Swalefigs615thru622%20.pdf





TREE DETAILS - NEW YORK, NY

City of New York's standard tree planting detail. For more information: http://www.nycgovparks.org/sub_permits_and_applications/images_and_pdfs/tree_planting_standards_2009.pdf

